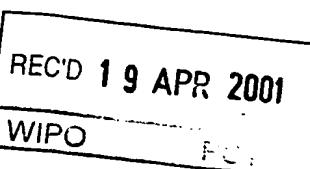


## PATENT COOPERATION TREATY

PCT



14

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 101676/PRS/JCB/DG	<b>FOR FURTHER ACTION</b> <small>See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)</small>	
International application No. PCT/IB00/00409	International filing date (day/month/year) 23/03/2000	Priority date (day/month/year) 23/03/1999
International Patent Classification (IPC) or national classification and IPC H04B7/185		
Applicant NOKIA NETWORKS OY et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 9 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 3 sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input checked="" type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li> <li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li> </ul>		

Date of submission of the demand 20/10/2000	Date of completion of this report 11.04.2001
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Draper, A Telephone No. +49 89 2399 8947



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/IB00/00409

## I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

### Description, pages:

1-6 as originally filed

### Claims, No.:

4-20,21 (part) as originally filed

1-3,21 (part),  
22-29 as received on 17/03/2001 with letter of 15/03/2001

### Drawings, sheets:

1/3-3/3 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IB00/00409

the description,      pages:

the claims,      Nos.:

the drawings,      sheets:

5.  This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability**

1. The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

the entire international application.

claims Nos. 28, 29.

because:

the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 28, 29 are so unclear that no meaningful opinion could be formed (*specify*):  
**see separate sheet**

the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

no international search report has been established for the said claims Nos. .

2. A meaningful international preliminary examination cannot be carried out due to the failure of the nucleotide and/or amino acid sequence listing to comply with the standard provided for in Annex C of the Administrative Instructions:

the written form has not been furnished or does not comply with the standard.

the computer readable form has not been furnished or does not comply with the standard.

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IB00/00409

**1. Statement**

Novelty (N)	Yes: Claims 5,27
	No: Claims 1-4,6-26
Inventive step (IS)	Yes: Claims 5
	No: Claims
Industrial applicability (IA)	Yes: Claims 1-27
	No: Claims

**2. Citations and explanations**  
**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:  
**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IB00/00409

**Section I**

Claims 1, 23 and 27 have been amended to refer to the fact that the server terminal has "a unique location area address". Page 5 first full paragraph discusses the fact that the server has its own identification address which indicates a location area code. No explicit support can however be found for "unique".

**Section III**

- 1). The scope of claims 28 and 29 is indeterminable - see also PCT Rule 6.2(a).

**Section V**

- 1). D1: EP-A-0 828 354 (ICO SERVICES LTD) 11 March 1998 (1998-03-11)
- 2). Claim 1 lacks novelty since D1 already discloses:

A telephone system for a vehicle comprising:

a vehicle transceiver (Fig. 10, 304), on board said vehicle, and connectable to a cellular telephone network (306, 308a..., 310a..., 312a..., 320a...) for bi-directional communication therewith;

a server terminal (348, see also D1, col. 4, lines 33-36), on board said vehicle, connected to said transceiver and having a [unique] location area address (see D1, col. 16, lines 38-41, column 18, lines 9-11 and abstract, last sentence);

a plurality of user terminals (320a...320q), distributed on board the vehicle, each capable of accepting an identity of a user of the cellular telephone system (SIM - see D1, col. 8, lines 27-29, col. 16, lines 9-11, col. 20, lines 7-14 and Fig. 13a) and each connected to said server terminal whereby a plurality of users may communicate simultaneously (D1, col. 4, lines 20-21) with said network via the server terminal; and

a location data base (D1, col. 9, line 54 to col. 10, line 6 - "local store" (48); see also col. 10, line 58 to col. 11, line 9 - "home database station" (15)) for identifying users of the cellular telephone system when their identities are accepted by respective user terminals and for associating those users with said location area address to permit communication to be established between those users and the

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IB00/00409

cellular telephone system via the server terminal.

- 3). Claim 2 also lacks novelty, since D1 also discloses:  
A telephone system according to claim 1 further comprising:  
a plurality of interface systems (D1, Fig. 1, 6a, 6b, 6c) each for providing a communication path (4b) between said transceiver and a switching network within a respective region, the switching network (6a-6c, 14a-14c, see also e.g. col. 9, line 31 to col. 10, line 42) being connected to said telephone network (PSTN) and connectable to at least one of said interface systems when the vehicle is located in the region corresponding to that interface system thereby providing a communication path between said transceiver and said telephone network; and control apparatus operable to select which one of said interface systems should provide the communication path to the transceiver when the vehicle is located in the regions corresponding to a plurality of interface systems (see col. 12, lines 54-58 and col. 14, lines 19-22).
- 4). Claim 3 also lacks novelty. D1 discloses:  
A telephone system according to claim 1 or 2 in which said location data base (48 or 15) is connected to said telephone network and is accessible to enable said network to locate each of said accepted users and thereby enable bi-directional communication between said telephone network and each of said identified users.
- 5). Claim 4 also lacks novelty. D1 discloses:  
A telephone system according to claim 2 or claim 3 when dependent on claim 2 wherein said control apparatus is further operable to control simultaneously the handover of said established communication when the vehicle moves from a first one of said regions to a second one of said regions (see D1, col. 8, lines 11-13).
- 6). The subject-matter of claim 5, namely a telephone system according to claim 4 wherein said identification address remains unaltered as said vehicle moves from said first to said second respective regions, does not appear to be suggested by any of the available prior art.
- 7). Claim 6 lacks novelty. D1 discloses:  
A telephone system according to any preceding claim wherein said telephone

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IB00/00409

system allows bi-directional communication between each user terminal in said vehicle and said telephone network (see Fig. 1).

- 8). Claim 7 also lacks novelty. D1 discloses:

A telephone system according to claim 2 or any of claims 3 to 6 when dependent upon claim 2 wherein each said interface system comprises a server satellite (Fig. 1, 4b) and at least one associated ground earth station (6a...6c).

- 9). Claim 8 also lacks novelty. D1 discloses:

A telephone system according to any one of the preceding claims wherein said vehicle transceiver comprises an aeronautical earth station for bi-directional communication via satellite to a ground earth station which is connectable to the telephone network (see Fig. 1).

N.B. "aeronautical earth station" does not have a specific definition. In any case, such known devices would come within the design purview of the skilled telecommunications engineer.

- 10). Claim 9 also lacks novelty. D1 discloses:

A telephone system according to any preceding claim wherein said location database is stored in a mobile switching centre (see D1, col. 9, lines 43-53).

- 11). Claim 10 also lacks novelty. D1 discloses:

A telephone system according to any preceding claim wherein said user terminal is connected to said server terminal via a first fixed connection and said server terminal is connected to said vehicle transceiver via a second fixed connection (see Fig. 10).

- 12). Claims 11 and 12 lack inventive step especially since it is made clear in D1 that the nature of the link from the mobiles to the central equipment of the aircraft is unimportant (see col. 22, lines 28-40). To the skilled person use of an RS-232 serial bus or USB for the connection would be an obvious design variant.

- 13). Claim 13 also lacks inventive step: Similarly, the skilled person would include the use of a CEPT-E1 connection in his/her routine design considerations.

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/IB00/00409

- 14). Claim 14 lacks novelty. See D1, Fig. 2.
- 15). Claim 15 also lacks novelty. See D1, Fig. 2 and col. 8, lines 27-29.
- 16). Claim 16 lacks inventive step: Evidently the cellular phone in D1 must also be connected to a phone "receptor" in order to make the connection. Whether the mobile belongs to the user is not an adaptation of the mobile.
- 17). Claim 17: None of the available prior art appears to suggest this feature.
- 18). Claim 18 lacks inventive step: PC's are commonly and routinely used for controlling purposes. The feature of this claim is regarded as trivial.
- 19). Claim 19 lacks novelty: See e.g. D1, col. 18, lines 45-49.
- 20). Claim 20 lacks inventive step: The use of an Internet network would be an obvious feature for the skilled telecoms engineer given his/her general knowledge of 3rd generation mobile communications.
- 21). Claim 21 lacks inventive step for similar reasons as claim 20.
- 22). Claim 22 lacks novelty: See D1, col. 1, lines 9-12.
- 23). Claim 23 lacks novelty for the same reasons as claim 1.
- 24). Claims 24 and 25 lack novelty: Cf. remarks concerning claim 2.
- 25). Claim 26 lacks novelty. Cf. remarks concerning claim 22.
- 26). The subject-matter of claim 27 defines "A telephone for use in a telephone system for a vehicle"..."said telephone being adapted to prevent RF emission when connected in a vehicle". All other features of the claim relate to the communications infrastructure of the vehicle. This subject-matter lacks novelty since a telephone for use in a vehicle, which telephone is "adapted" to prevent RF emission when connected in a vehicle is already known from D1 (see column 5,

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

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International application No. PCT/IB00/00409

line 13 and lines 19-23).

27). The scope of claims 28 and 29 is indeterminable.

**Section VII**

1). The description has not been brought into conformity with the new claims. The two-part form of claims has not been used (Rule 6.3(b)(i) and (ii)), and reference signs have not been inserted in the claims (Rule 6.2(b)). Relevant prior art documents (i.e. D1) have not been acknowledged (Rule 5.1(a)(ii)).

**Section VIII**

- 1). Claims 28 and 29 are of indeterminate scope - see also PCT Rule 6.2(a).
- 2). The scope of claim 27 is unclear (Article 6) since it ostensibly relates to a telephone (handset) *per se* but in the main defines features of the entire telephone system.

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>101676/PRS/J</b>	<b>FOR FURTHER ACTION</b> see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. <b>PCT/IB 00/00409</b>	International filing date (day/month/year) <b>23/03/2000</b>	(Earliest) Priority Date (day/month/year) <b>23/03/1999</b>
Applicant <b>NOKIA NETWORKS OY et al.</b>		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

- the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).
- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing :
- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2.  Certain claims were found unsearchable (See Box I).

3.  Unity of Invention is lacking (see Box II).

4. With regard to the title,

- the text is approved as submitted by the applicant.
- the text has been established by this Authority to read as follows:

5. With regard to the abstract,

- the text is approved as submitted by the applicant.
- the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

- as suggested by the applicant.
- because the applicant failed to suggest a figure.
- because this figure better characterizes the invention.

1

None of the figures.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/00409

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H04B7/185

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 828 354 A (ICO SERVICES LTD) 11 March 1998 (1998-03-11)</p> <p>column 4, line 19 - line 31 column 5, line 6 - line 23 column 12, line 16 - line 31 column 15, line 26 - line 16 column 17, line 16 - line 58 column 18, line 5 -column 19, line 23 column 22, line 28 - line 32 column 22, line 41 - line 53 column 23, line 22 - line 26</p> <p>---</p> <p style="text-align: right;">-/--</p>	1-3, 6-10, 14, 15, 19, 22-27

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

3 July 2000

Date of mailing of the international search report

10/07/2000

Name and mailing address of the ISA

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Authorized officer

Dionisi, M

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB 00/00409

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 94 28684 A (PALMGREN CHRISTER ;NORDICTEL AB (SE); OERNEHOLM FLEMMING (SE)) 8 December 1994 (1994-12-08) page 4, line 25 -page 5, line 24 page 8, line 17 -page 9, line 27 ---	1,23,27
A	GB 2 310 973 A (MOTOROLA INC) 10 September 1997 (1997-09-10) page 4, line 21 -page 5, line 6 page 6, line 25 -page 7, line 10 page 8, line 12 - line 18 ---	1,23,27
A	CASEWELL I E: "THE PROVISION OF GSM CELLULAR RADIO ENVIRONMENTS WITHIN PASSENGER AIRCRAFT OPERATING OVER EUROPE" INTERNATIONAL CONFERENCE 5TH. MOBILE RADIO & PERSONAL COMMUNICATIONS, 11-14 DEC. 1989, COVENTRY, GB, 1989, pages 172-176, XP000783796 page 173, paragraph 4.2 -----	1,23,27

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International Application No

PCT/IB 00/00409

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP 0828354	A 11-03-1998	GB 2317074 A	JP 10155178 A	11-03-1998 09-06-1998
WO 9428684	A 08-12-1994	SE 500443 C	AU 6901994 A	27-06-1994 20-12-1994
		SE 9301784 A		27-06-1994
GB 2310973	A 10-09-1997	FR 2745675 A		05-09-1997

PCT

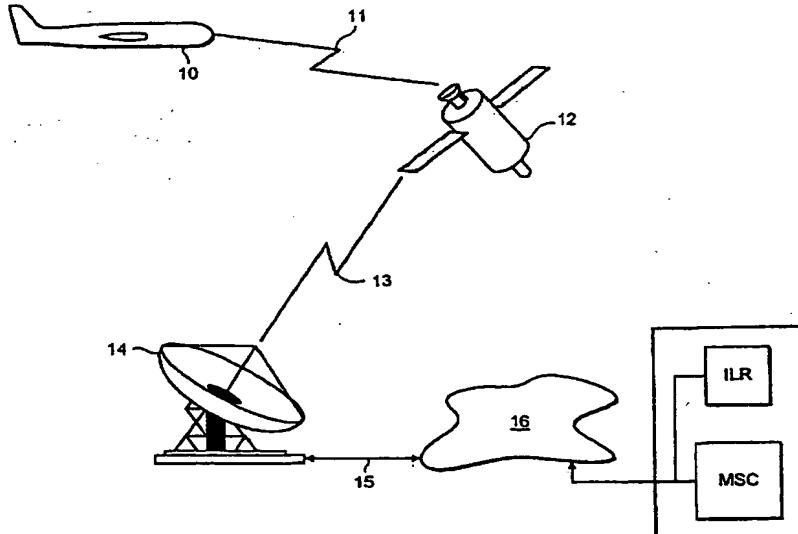
WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : <b>H04B 7/185</b>	A1	(11) International Publication Number: <b>WO 00/57578</b> (43) International Publication Date: 28 September 2000 (28.09.00)
(21) International Application Number: <b>PCT/IB00/00409</b>		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
(22) International Filing Date: 23 March 2000 (23.03.00)		
(30) Priority Data: 9906746.4 23 March 1999 (23.03.99) GB		
(71) Applicant (for all designated States except US): NOKIA NETWORKS OY [FI/FI]; Keilalahdentie, FIN-02150 Espoo (FI).		
(72) Inventors; and		Published
(75) Inventors/Applicants (for US only): SINIVAARA, Hasse [FI/FI]; Tahkorinne 19 A 1, FIN-02760 Espoo (FI). RAUTIOLA, Markku [FI/FI]; Kaonpääkatu 47, FIN-33820 Tampere (FI).		With international search report.
(74) Agents: SLINGSBY, Philip, Roy et al.; Page White & Farrer, 54 Doughty Street, London WC1N 2LS (GB).		

(54) Title: VEHICLE TELEPHONE SYSTEM



(57) Abstract

A telephone system for a vehicle comprising: a vehicle transceiver, on board said vehicle, and connectable to a cellular telephone network for bi-directional communication therewith; a server terminal, on board said vehicle, connected to said transceiver and having an identification address; a plurality of user terminals, distributed on board the vehicle, each capable of accepting an identity of a user of the cellular telephone system and each connected to said server terminal whereby a plurality of users may communicate simultaneously with said network via the server terminal; and a location data base for identifying users of the cellular telephone system when their identities are accepted by respective user terminals and for associating those users with said identification address to permit communication to be established between those users and the cellular telephone system via the server terminal.

**FOR THE PURPOSES OF INFORMATION ONLY**

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## VEHICLE TELEPHONE SYSTEM

The present invention relates to a telephone system for use in a vehicle, which is applicable to cellular telephone systems such as GSM or DCS cellular systems and U.S. standard systems.

It is known that RF mobile telephones using cellular networks are not generally used in aircraft due to the belief that there is the possibility of interference with aircraft equipment.

It is also known that generally only fixed line systems are installed into aircraft. These fixed line systems are capacity limited so that the number of calls to and from an aircraft at any one time is limited to a few simultaneous calls.

Furthermore as any vehicle which has a satellite communication system, as the vehicle moves from a region of coverage provided by one satellite to that of another all calls must be individually "handed over". This can lead to calls being dropped.

It is an object of the present invention to at least partly mitigate the above problems.

According to the present invention there is provided a telephone system for a vehicle comprising a vehicle transceiver, on board said vehicle, and connectable to a cellular telephone network for bi-directional communication therewith, a server terminal, on board said vehicle, connected to said transceiver and having an identification address, a plurality of user terminals, distributed on board the vehicle, each capable of accepting an identity of a user of the cellular telephone system and each connected to said server terminal whereby a plurality of users may communicate simultaneously with said network via the server terminal, and a location data base for identifying users of the cellular telephone system when their identities are accepted by respective user terminals and for associating those users with said identification address to permit communication to be established between those users and the cellular telephone

system via the server terminal.

Preferably the telephone system further comprises a plurality of interface systems each for providing a communication path between said transceiver and a switching network within a respective region, the switching network being connected to said telephone network and connectable to at least one of said interface systems when the vehicle is located in the region corresponding to that interface system thereby providing a communication path between said transceiver and said telephone network, and control apparatus operable to select which one of said interface systems should provide the communication path to the transceiver when the vehicle is located in the regions corresponding to a plurality of interface systems.

Conveniently the location data base is connected to said telephone network and is accessible to enable said network to locate each of said accepted users and thereby enable bi-directional communication between said telephone network and each of said identified users.

Advantageously the control apparatus is further operable to control simultaneously the handover of said established communication when the vehicle moves from a first one of said regions to a second one of said regions.

According to the present invention there is also provided a method of operating a telephone system within a vehicle to enable a plurality of users to simultaneously communicate with a ground based cellular telephone system, which method comprises establishing a fixed connection through a plurality of user terminals distributed on board the vehicle to a server terminal having an identification address, establishing a connection between said server terminal and an onboard transceiver, identifying users of the cellular telephone system when their identities are accepted by respective user terminals, and associating identified users with said identification address to permit simultaneous communication to be established between those users and the cellular telephone system via the server terminal.

The vehicle may suitably be an aircraft, train or boat.

An embodiment of the invention will now be described hereinafter by way of example only and with reference to the accompanying drawings in which:

Figure 1 is a schematic view of a telephone communication system.

Figure 2 is a schematic view of the vehicle telephone systems.

Figure 3 schematically shows the aircraft in transit.

In the drawings like reference numerals refer to like parts.

The telephone system of this example enables subscribers to a cellular mobile telephone system to use telephones within an aircraft without causing interference with the aircraft equipment. The system is particularly applicable to subscribers to a known GSM/DCS network in which the user has a SIM card which the user may locate in a receptor in a phone to use the services available to him. The system may however be used with any mobile telephone system.

In the general scheme shown in Figure 1 a plurality of users within an aircraft 10 are able to transmit or receive telephone messages through a transceiver located within the aircraft 10 which communicates via a satellite 12 to a ground earth station 14 using standard E1-link (CEPT E1) links 11 and 13. The ground earth station communicates through an internet protocol (IP) (WAN = Wide Area Network) to a mobile switching centre (MSC) linked to a public service telephone network (PSTN). The operation of the mobile switching centre, ground earth station 14, and public switching telephone network are conventional in established cellular telephone networks.

The IP system 16 is integrated into the conventional cellular network topology as one part of the network structure. It is one alternative medium to link the mobile traffic from one location to another. At GES the GI signal is converted into IP traffic.

Figure 2 illustrates the aircraft telephone system 20 in more detail. The transmission and receipt of telephone message to and from the aircraft 10 are handled by a transceiver which in the example is an aeronautical earth station (AES). The aeronautical earth station communicates with a satellite 12 via E1 link 11 in a conventional way.

The aeronautical earth station is connected to a server terminal 23 such as a PC server terminal via a fixed connection 22 which may be a CEPT-E1 2 Mbit fixed connection.

The PC has software which controls the mobile telephones 25 which are distributed throughout the aircraft 10. Each mobile telephone (or user terminal) is connected via a fixed connection 26 such as an RS-232 serial bus or universal serial bus (USB). The actual RS-232/USB network can be built by using twisted pair, fibre links or tiered star connections.

By connecting the user terminals to the server PC and transceiver 21 via fixed links RF interference is avoided. In order to ensure that no RF interference is created aircraft mobiles are provided which are permanently connected via connector 26 to the USB and which have no GSM RF emitting antenna. Passengers put their own SIM cards or other identifier in a receptor in the phone.

By inserting the SIM card into the aircraft mobile or by connecting the user's own mobile the user indicates when he wishes to use the telephone system so that he is identified by his own telephone number. This enables the user to be contacted in the aircraft and to utilise the services which are normally available and also allows the user to be identified for billing.

The mobile telephones 25 are connected into an Intranet cluster in the aircraft mobile network. When a user places his SIM card into the aircraft mobile telephone 25, or the telephone is connected to the transceiver via the PC server terminal and can thereby communicate with the ground based telephone network via satellite link. The mobile

switching centre which is part of the telephone network is updated with the SIM identity.

The cellular network thereafter identifies that that the user is in the aircraft.

The server PC 23 has its own identification address which is equivalent to the address stored in the visitor location register (VLR) database in a conventional mobile switching centre (MSC). The database could be in any suitable form and stored at any suitable unit; in this example it is stored in an Intranet location register (ILR) database. The Intranet location register database is updated when the SIM card is replaced by a user in the aircraft so that the mobile has a new location area code (LAC). Each aircraft mobile network (AMNW) forms one location area and users in the aircraft are always associated with that area code when connected in the aircraft.

The provision of an Intranet mobile cluster whereby a plurality of users are associated with a single IP address allows the handover of calls to be carried out more conveniently. For example and with reference to Figure 3 the Inmarsat satellite system has at least three satellites 30 in orbit each of which covers a certain region or area over the globe 32. One handover area is above the Norwegian sea. As an aircraft moves from one region to another calls currently being made on board the aircraft must be handed over from one satellite and its associated ground earth station 14 to the next satellite and its associated ground earth station. The new routing ground earth station therefore has to be selected in accordance with the position of the aircraft. The telephone system therefore selects which one of the satellites and ground earth stations should provide the communication path to the transceiver when the aircraft is located in regions corresponding to more than one satellite to provide the strongest signal. As the aircraft moves from one region to another the IP address of the aeronautical mobile network remains the same. This minimises the chance that the short satellite link timeout, which affects calls to and from the aircraft, results in calls being dropped.

It will be appreciated that the use of the fixed connection in the aircraft telephone system prevents interference with the aircraft equipment. Furthermore the use of the described aircraft telephone system allows many users to make simultaneous calls to or from the aircraft.

The invention is not limited to the details of the foregoing example.

**CLAIMS**

1. A telephone system for a vehicle comprising:
  - a vehicle transceiver, on board said vehicle, and connectable to a cellular telephone network for bi-directional communication therewith;
  - a server terminal, on board said vehicle, connected to said transceiver and having an identification address;
  - a plurality of user terminals, distributed on board the vehicle, each capable of accepting an identity of a user of the cellular telephone system and each connected to said server terminal whereby a plurality of users may communicate simultaneously with said network via the server terminal; and
  - a location data base for identifying users of the cellular telephone system when their identities are accepted by respective user terminals and for associating those users with said identification address to permit communication to be established between those users and the cellular telephone system via the server terminal.
2. A telephone system according to claim 1 further comprising:
  - a plurality of interface systems each for providing a communication path between said transceiver and a switching network within a respective region, the switching network being connected to said telephone network and connectable to at least one of said interface systems when the vehicle is located in the region corresponding to that interface system thereby providing a communication path between said transceiver and said telephone network; and
  - control apparatus operable to select which one of said interface systems should provide the communication path to the transceiver when the vehicle is located in the regions corresponding to a plurality of interface systems.
3. A telephone system according to claim 1 or 2 in which said location data base is connected to said telephone network and is accessible to enable said network to locate each of said accepted users and thereby enable bi-directional communication between said telephone network and each of said identified users.

4. A telephone system according to claim 2 or claim 3 when dependent on claim 2 wherein said control apparatus is further operable to control simultaneously the handover of said established communication when the vehicle moves from a first one of said regions to a second one of said regions.
5. A telephone system according to claim 4 wherein said identification address remains unaltered as said vehicle moves from said first to said second respective regions.
6. A telephone system according to any preceding claim wherein said telephone system allows bi-directional communication between each user terminal in said vehicle and said telephone network.
7. A telephone system according to claim 2 or any of claims 3 to 6 when dependent upon claim 2 wherein each said interface system comprises a server satellite and at least one associated ground earth station.
8. A telephone system according to any one of the preceding claims wherein said vehicle transceiver comprises an aeronautical earth station for bi-directional communication via satellite to a ground earth station which is connectable to the telephone network.
9. A telephone system according to any preceding claim wherein said location database is stored in a mobile switching centre.
10. A telephone system according to any preceding claim wherein said user terminal is connected to said server terminal via a first fixed connection and said server terminal is connected to said vehicle transceiver via a second fixed connection.
11. A telephone system according to claim 10 wherein said first fixed connection is an RS-232 serial bus or USB.

12. A telephone system according to claim 10 wherein said first fixed connection is a universal serial bus (USB).
13. A telephone system according to claim 10 wherein said second fixed connection is a CEPT-E1 connection.
14. A telephone system according to any preceding claim wherein said user terminal comprises a cellular phone unit provided with an identification receptor for a subscription identifier of a user of the cellular telephone system.
15. A telephone system according to claim 14 in which the identifier is a SIM card or Smart Card.
16. A telephone system according to any one of claims 1 to 13 wherein said user terminal comprises a phone receptor for receiving a user cellular phone.
17. A telephone system according to claim 16 wherein said user cellular phone is adapted to deactivate radio transmission by the cellular phone when said cellular phone is connected to said phone receptor.
18. A telephone system according to any preceding claim wherein said server terminal comprises a personal computer (PC).
19. A telephone system according to any preceding claim wherein said location database identifies which user of the cellular telephone system is connected to a user terminal by a subscription identifier.
20. A telephone system according to claim 2 or any of claims 3 to 19 when dependent on claim 2 wherein said switching network and control apparatus comprise an internet network.
21. A telephone system according to claim 20 wherein said location database is an

Intranet location register.

22. A telephone system according to any preceding claim, wherein the vehicle is an aircraft.

23. A method of operating a telephone system within a vehicle to enable a plurality of users to simultaneously communicate with a ground based cellular telephone system, which method comprises:

establishing a fixed connection through a plurality of user terminals distributed on board the vehicle to a server terminal having an identification address;

establishing a connection between said server terminal and an onboard transceiver;

identifying users of the cellular telephone system when their identities are accepted by respective user terminals; and

associating identified users with said identification address to permit simultaneous communication to be established between those users and the cellular telephone system via the server terminal.

24. A method according to claim 23, further comprising:

establishing a communication path between said transceiver and a switching network via a satellite and associated ground station when said vehicle is in a respective region wherein said switching network is connected to said cellular telephone system.

25. A method according to claim 23 or 24, further comprising:

selecting which satellite should provide a communication path to the transceiver when the vehicle is located in a region corresponding to a plurality of satellites.

26. A method according to any of claims 23 to 25, wherein the vehicle is an aircraft.

27. A telephone for use in a telephone system for a vehicle comprising: a vehicle transceiver, on board said vehicle, and connectable to a cellular telephone network for

bi-directional communication therewith; a server terminal, on board said vehicle, connected to said transceiver and having an identification address; a plurality of user terminals, distributed on board the vehicle, each capable of accepting an identity of a user of the cellular telephone system and each connected to said server terminal whereby a plurality of users may communicate simultaneously with said network via the server terminal; and a location data base for identifying users of the cellular telephone system when their identities are accepted by respective user terminals and for associating those users with said identification address to permit communication to be established between those users and the cellular telephone system via the server terminal; said telephone being adapted to prevent RF emission when connected in a vehicle.

28. A telephone system constructed and arranged substantially as herein described with reference to or as shown in Figures 1 to 3.

29. A method as herein described with reference to or as shown in Figures 1 to 3.

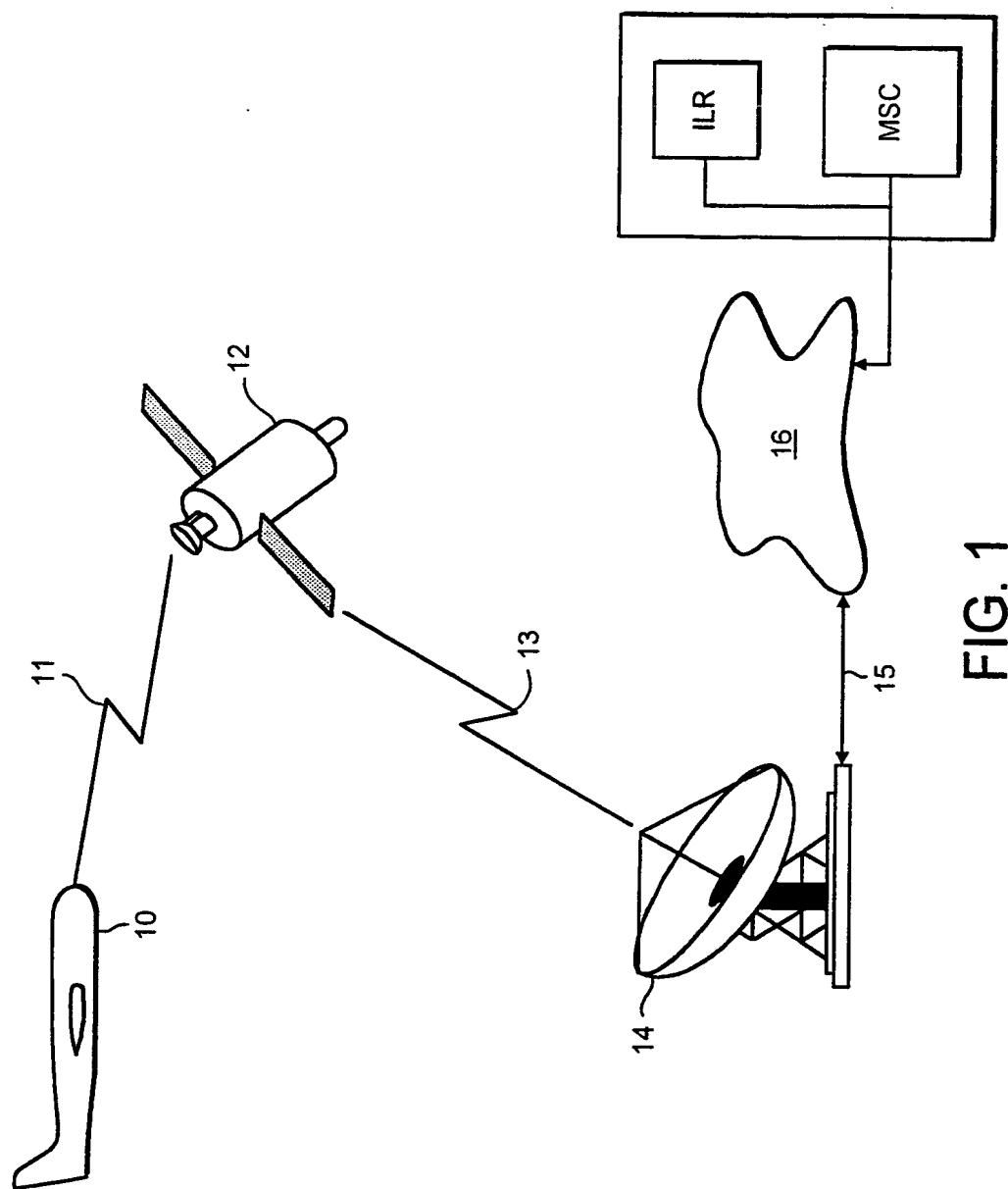


FIG. 1

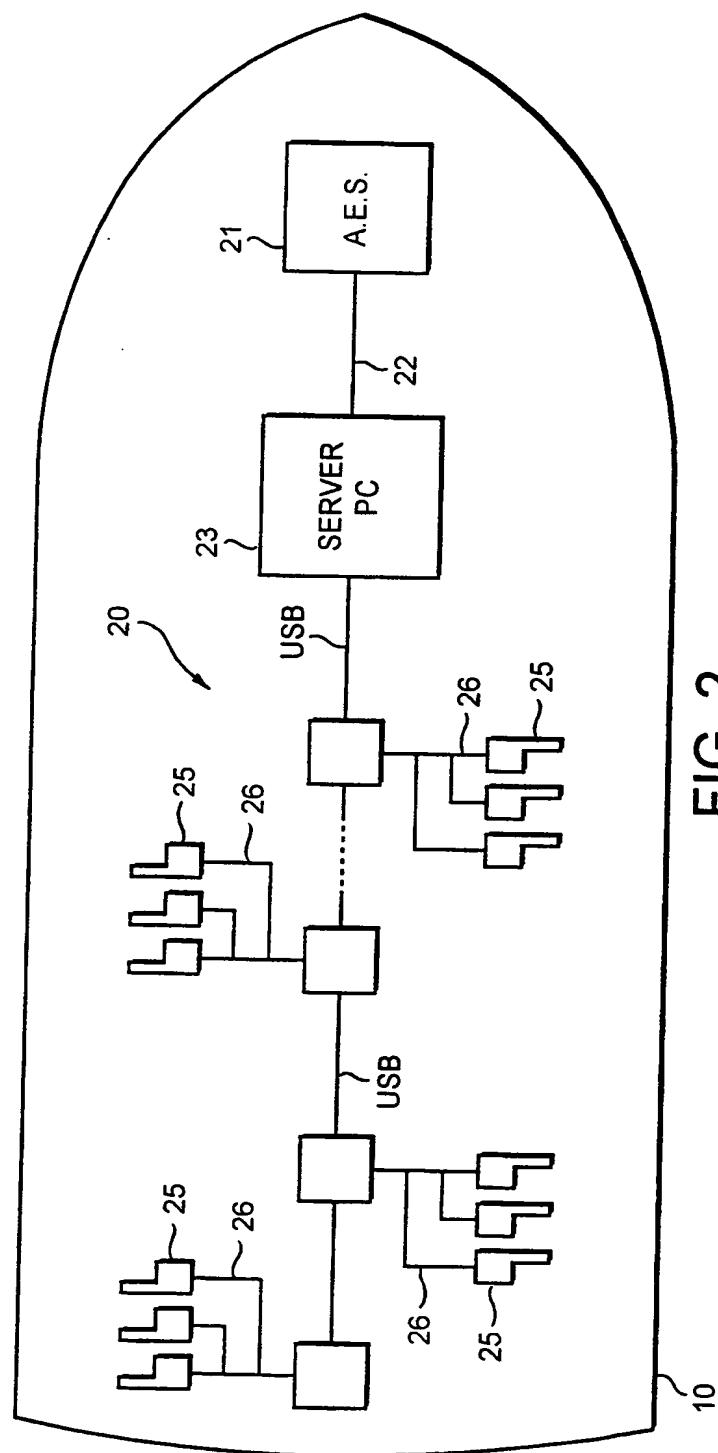


FIG. 2

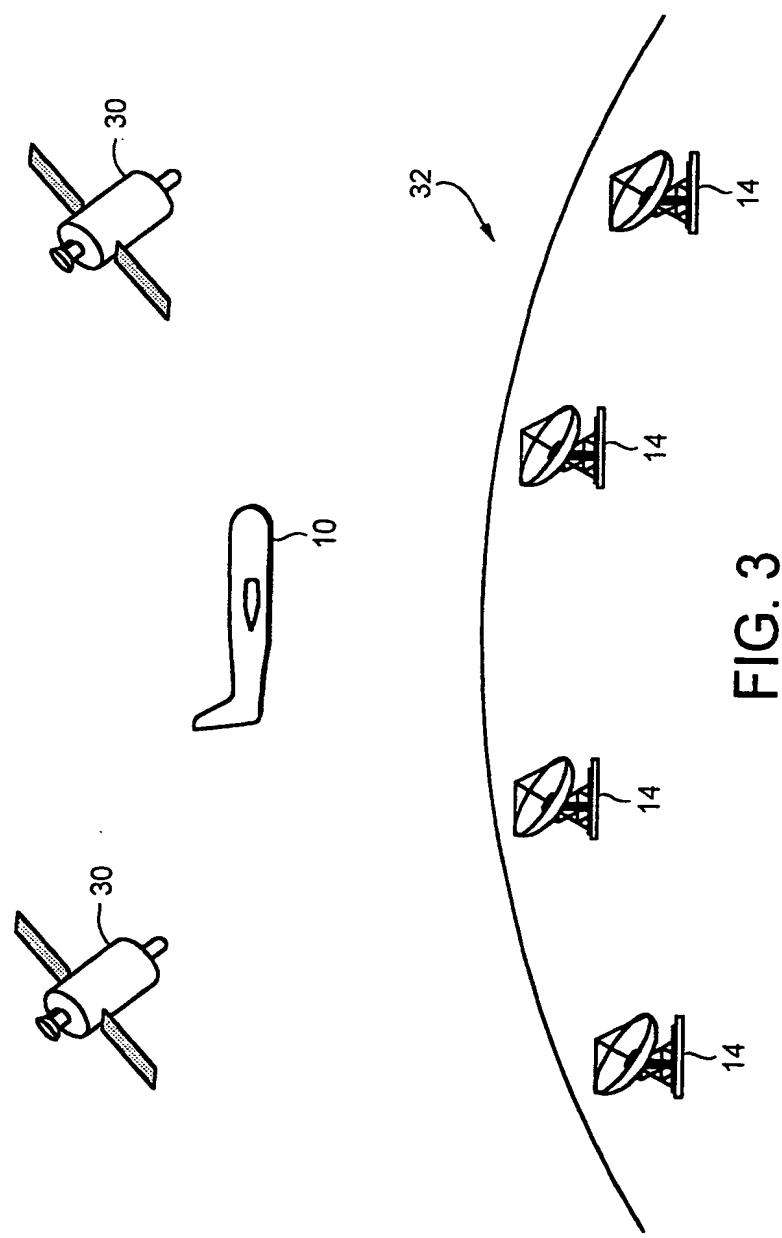


FIG. 3

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB 00/00409

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04B7/185

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, INSPEC

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>EP 0 828 354 A (ICO SERVICES LTD) 11 March 1998 (1998-03-11)</p> <p>column 4, line 19 – line 31 column 5, line 6 – line 23 column 12, line 16 – line 31 column 15, line 26 – line 16 column 17, line 16 – line 58 column 18, line 5 – column 19, line 23 column 22, line 28 – line 32 column 22, line 41 – line 53 column 23, line 22 – line 26</p> <p>—</p> <p style="text-align: center;">-/-</p>	<p>1-3, 6-10, 14, 15, 19, 22-27</p>

Further documents are listed in continuation of box C.

Patent family members are listed in annex.

\* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
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\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

3 July 2000

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## INTERNATIONAL SEARCH REPORT

Int'l. Appl. No.  
PCT/IB 00/00409

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 94 28684 A (PALMGREN CHRISTER ;NORDICTEL AB (SE); OERNEHOLM FLEMMING (SE)) 8 December 1994 (1994-12-08) page 4, line 25 -page 5, line 24 page 8, line 17 -page 9, line 27	1,23,27
A	GB 2 310 973 A (MOTOROLA INC) 10 September 1997 (1997-09-10) page 4, line 21 -page 5, line 6 page 6, line 25 -page 7, line 10 page 8, line 12 - line 18	1,23,27
A	CASEWELL I E: "THE PROVISION OF GSM CELLULAR RADIO ENVIRONMENTS WITHIN PASSENGER AIRCRAFT OPERATING OVER EUROPE" INTERNATIONAL CONFERENCE 5TH. MOBILE RADIO & PERSONAL COMMUNICATIONS, 11-14 DEC. 1989, COVENTRY, GB, 1989, pages 172-176, XP000783796 page 173, paragraph 4.2	1,23,27

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 00/00409

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP 0828354	A 11-03-1998	GB 2317074 A	JP 10155178 A	11-03-1998 09-06-1998
WO 9428684	A 08-12-1994	SE 500443 C	AU 6901994 A	27-06-1994 20-12-1994
		SE 9301784 A		27-06-1994
GB 2310973	A 10-09-1997	FR 2745675 A		05-09-1997